Enhancing Students' Vocabulary Learning Through Interactive Digital Media: Learners' Perceptions and Outcomes

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Abstract

The goal of this study is to find out how digital media affects students' vocabulary learning. Most studies have focused on improving students' vocabulary acquisition through traditional teaching methods, but the current study focuses on enhancing students' vocabulary learning using computer assisted learning method. The study highly benefits both language teachers and students in developing their vocabulary knowledge in interactive ways. A mixed research approach (quantitative and qualitative) was used in this study. The participants in this study were selected using a sample random sampling technique. The total number of the respondents is 230 undergraduate Engineering students from two private universities in Chennai, India. In this study, 153 male and 77 female students participated as a sample. A questionnaire was used as data gathering tool. The questionnaire consists 12 items. Excel software was employed to analyze the collected data. The findings of the study reveal that students have positive attitudes toward using technology in the classroom to develop their vocabulary knowledge. The findings also show that digital media helps students expand their vocabulary more effectively than traditional methods. Besides, the findings reveal that students feel more motivated to learn new vocabulary using digital media when compared to traditional methods, and digital media offers a more interactive and engaging way to learn vocabulary. In addition, the study suggests that English teachers should use digital media in the classroom to enhance learners' vocabulary learning.

Keywords: acquisition, enhancing, digital media, perceptions, retention, vocabulary

1. Introduction

Vocabulary acquisition is increasingly acknowledged as a crucial component of language acquisition (Uberman, 1998). It is generally accepted that vocabulary gives a language its essential depth and substance, whereas language structures provide the language's framework (Harmer, 1997). The fast development of technology in recent years has completely changed the educational environment by presenting new and conducive learning options. A remarkable advancement in this field is the application of digital media learning environments, which has attracted the interest of both educators and researchers (Sweller, 2004). The learning environments have demonstrated significant potential in augmenting the academic experience in diverse fields. Digital media learning environments are adaptable platforms for providing educational content because they include various tools and instructional tactics, such as voice narration, on-screen text, animations, and interactive elements (Tuovinen and Paas, 2004).

In this globalized age, being able to communicate effectively in English is becoming more and more important for people in a variety of academic and professional contexts. As the main language of communication, English has established itself as a universal lingua franca having numerous vocabularies (Homer et al., 2006). English language learning has several facets in education, ranging from the development of foundational vocabulary to sophisticated comprehension (Yanguas, 2009).

Acquiring a wide range of vocabulary is essential to be proficient in a language, especially when learning a second language. Learners' vocabulary knowledge is the determinant to communicate successfully in a second language. Numerous studies have shown how crucial it is to build a large vocabulary to understand a variety of texts and have meaningful conversations (Mayer, 2005). The process of learning vocabulary is intricate and includes two main components: incidental vocabulary learning, which happens naturally as a result of language

use without clear learning goals, and purposeful vocabulary acquisition, where students consciously concentrate on increasing their vocabulary (Barcroft, 2009).

Digital media learning environments have opened new avenues to improve learners' vocabulary acquisition. It offers opportunities for educators and students to improve the foreign language learning process (Zhang and Zou, 2021). Text, graphics, and music are combined in digital media illustrations to help students comprehend and remember vocabulary. Consequently, learners' attention has been drawn to word meanings through digital media explanations, which have been implemented to improve vocabulary learning (Acha, 2009). Many researchers have supported the usefulness of digital media for vocabulary learning. Research by Yeh and Wang (2003) showed that digital media explanations that combined text and visuals worked better than those that just used text or text and video.

This study aims to investigate the impact of digital media on vocabulary learning and retention. It is crucial to comprehend how these digital media technologies can be tailored to maximize vocabulary acquisition while limiting the segmentation of instructional content in the modern era of advanced digital media learning settings. It provides important insights into second language acquisition by examining how digital media impacts students' vocabulary learning and retention. The objectives of the study are:

- To investigate the impact of digital media on vocabulary learning.
- To explore the use of digital media for students' vocabulary retention.
- To identify students' perception of the use of digital media to enhance their vocabulary learning
- To compare print material with digital media to identify a better method to improve students' vocabulary learning

2. Literature Review

Many researchers have acknowledged the use of digital media for English language learning. Digital media plays a key role in supporting vocabulary integration into learning outcomes. Chiu and Liu (2013) examined the usage of digital media and students' participation in Computer Assisted Language Learning to determine the overall efficacy of L2 computer-assisted vocabulary learning. The results demonstrated a positive impact of computer-assisted vocabulary acquisition in second language learning.

Zhang and Zou (2021) investigated the impact of digital media tools that are utilized to learn a second language. The study found that digital media is used to deliver the lesson, and the input of digital media may have a significant effect on second language learning. According to this study, digital media has a potential influence to engage learning attention. Furthermore, Bancha and Tongtep (2021) conducted a comparison between vocabulary exercises found in learning management systems and vocabulary games played online to improve students' vocabulary acquisition. The result demonstrated that online vocabulary games can aid in students' vocabulary memorization and retention.

In addition, Lwo and Lin (2012) suggested that using videos with captions in a digital media learning environment was preferable for less proficient learners. Teng and Zhang (2021) found that the best vocabulary learning outcome corresponded to having video input to supplement word information and its definition.

Students' vocabulary performance improved when technology, such as computers and smartphones, is used in teaching–learning process (Taj et al., 2017). According to several studies (Gonen, 2018; Taj et al., 2017; Yue, 2017), using technology, such as computers and mobile phones, enhances students' vocabulary development. Digital media encourages students to actively learn and let them concentrate on course material (Ivers & Baron, 2002). Teng (2020) discovered that watching movies has a major impact on vocabulary acquisition. Students who interacted with the words that came on the screen were eager to employ the educational online games approach to improve their vocabulary knowledge. Similarly, Zou et al. (2019) discovered that playing online games encourages communication among students and has a beneficial impact on short- and long-term vocabulary acquisition.

Similarly, John and George (2024) explored the impact of social media and electronic literature on young individuals' lives, especially in literary studies, foreign language learning and acculturation. The study revealed that social media and digital technology have a pivotal impact on students' vocabulary knowledge. The study found that digital media helps to enhance the mode of language teaching and make the classes interesting.

In addition, John (2024) examined the role of gamification in enhancing English language teaching and investigates how it helps in improving student' vocabulary, teacher-student rapport, teacher immediacy, and students' willingness to communicate.

Tai and Zuo (2024) stated that digital media uses diverse semiotic resources which extend beyond traditional linguistic boundaries and mobilizes various modes of communication to visualize the target vocabulary items. According to Chan and Cheuk (2020), English classroom activities which focus on improving lexical knowledge help ESL learners to better communicate in a target language effectively.

Although research on digital media teaching resources for vocabulary acquisition is still in its early stages, the previous studies offer a few valuable insights to second language learners. Moreover, most studies have overlooked the significance of digital media for students' vocabulary development and language learning. Besides, there is a research gap on how digital media affects students' vocabulary acquisition and retention in second languages. Therefore, this study aims to explore how digital media learning environments can maximize students' vocabulary development. The study seeks to answer the following research questions:

- What is the impact of digital media on students' vocabulary learning?

- How do students use digital media for vocabulary retention?
- What are students' perceptions of using digital media to enhance their vocabulary learning?
- Which method is more effective in improving students' vocabulary learning: print materials or digital media?

3. Research Methodology

For this study, mixed research approach was employed. The participants in this study were selected using a simple random sampling technique. The total number of the respondents is 230 undergraduate Engineering students from two private universities in Chennai, India. In this study, 153 male and 77 female students participated as a sample. A questionnaire was used as data gathering tool. The questionnaire consists 12 items. The collected data were analyzed using Excel. Tables and figures are employed to display the results. Then, the findings are explained in quantitative and qualitative approaches. The researchers ensured that the respondents were selected to participate without any pressure being applied; informed the reason and purpose of the research; and agreement was sought from the management of the selected universities before the beginning of this research initiative. In addition, the researchers took into account the cultural context dealing with ethical concerns.

4. Results

4.1Demographic information

Gender	Male		Female	Total
	153		77	230
	66.5%		33.5%	100%

In this study, 66.5% of the participants were male students and 33.5% of the participants were female students.

4.2 Analysis of the Data

1. I feel that digital media helps me expand my vocabulary more effectively than traditional methods.

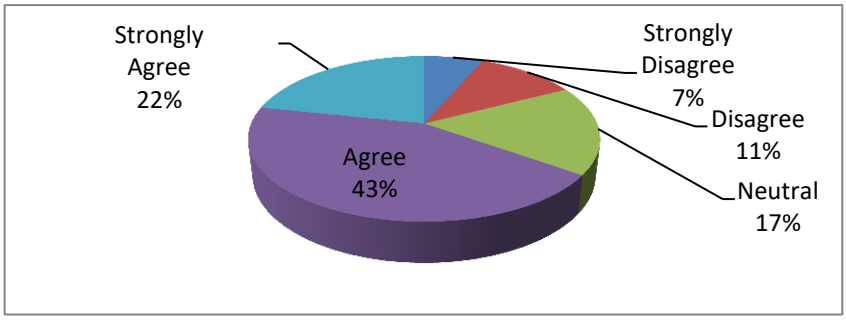

Figure 1. Respondents' level of agreement about digital media helping them expand their vocabulary more than traditional methods

Figure 1 shows different opinions on the effectiveness of digital media compared to traditional teaching methods in enhancing students' vocabulary knowledge. A significant percentage, 44% of the respondents agree that digital media helps them learn new words and phrases more effectively. It goes on to show that most learners find value in digital platforms to learn new words and phrases, due to the interactivity and variety contents of digital media. 22% of the respondents strongly agree with the statement, indicating that learners are confident in the role of digital media in vocabulary expansion. This means this group is interested in using digital devices, like applications or online services, to learn languages. 6% of the respondents strongly disagree with the statement, and 11% of the respondents disagree with the statement. This implies that a number of the learners either do not find digital media useful for learning vocabulary or they prefer the more conventional ways. 17% of the respondents were neutral on this issue. The result of the study reveals that the majority of the students feel that digital media helps them expand their vocabulary more effectively than traditional methods.

2. I often encounter new vocabulary words using digital media.

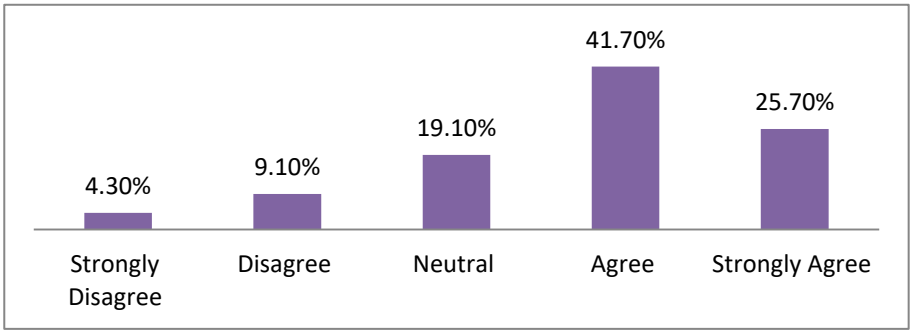

Figure 2. Respondents' level of agreement about the usefulness of digital media in learning vocabulary

Figure 2 illustrates how often a respondent comes across new vocabulary words while engaging in digital media. In this case, 41.7% of learners agreed that they often come across new vocabulary when using digital media. This means many learners find digital platforms to be rich in new words and phrasal elements, a function perhaps of the diversity and dynamism of online materials. In addition, 25.7% of the respondents strongly agree with this statement. Thus, most students find new words in digital media. These learners experience acquiring new words as they use different types of digital media. However, 10% of the respondents strongly disagree that they often come across new vocabularies via digital means. This group suggests that digital media may not be a major source for increasing their vocabulary learning. In addition, 9.1% of respondents disagreed with the statement. This means that they might use digital media but they do not find it useful in finding new vocabulary. 19.1% of the respondents remain neutral about the statement. In general, the results show that digital media as a source of new words is acceptable. Most learners find value in digital platforms for building up vocabularies. This could be due to the diversity of contents and interactive features provided by digital media. the result of the study exhibits that most students often encounter new vocabulary words using digital media.

3. Digital media helps me use new vocabulary in real-life contexts.

Table 1. Respondents' level of agreement about digital media helping them use new vocabulary in real-life contexts

	Percent
Strongly Disagree	18 (7.8%)
Disagree	18 (7.8%)
Neutral	38 (16.5%)
Agree	103 (44.8%)
Strongly Agree	53 (23.0%)

Table 1 indicates students' perception of the use of digital media in acquiring new vocabulary and applying them to real-life contexts. 44.8% of respondents agree that through digital media they can apply new words in practical situations. This indicates that exposure to vocabulary via digital platforms for many learners carries value in real-life practical application. In addition, 23% of the respondents strongly agree with the statement. This group believes that digital media significantly contributes to their ability to encounter and apply new vocabulary effectively in everyday contexts. This group of students benefit from the contextual exposure provided by digital resources such as news articles, social media, and interactive content. However, 7.8% of the respondents strongly disagree that digital media helps in real-life vocabulary use. They would prefer other ways or resources to learn new words. Furthermore, 7.8% of the participants disagree with the statement and it indicates that they might be using digital media, they don't find it much valuable for learning new vocabulary. This might mean that they are in favor of more traditional kinds of learning methods or other types of resources. Another 16.5% of the respondents are neutral. This group does not have strong feelings regarding the effectiveness of digital media in providing real-life context for the application of vocabulary. Generally, the majority of the respondents find the use of digital media effective in their real-life contexts application of vocabulary.

4. I use digital media to look up the meanings of unfamiliar words.

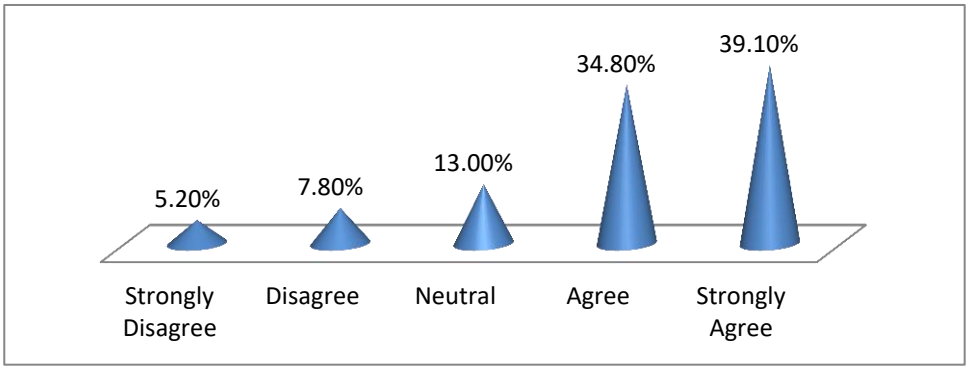

Figure 3. Respondents' level of agreement about the use of digital media for looking up the meanings of unfamiliar words

Figure 3 reveals learners' experiences with the use of digital media to find the meanings of new words. 34.8% of the respondents agree that they were searching for words they did not know on digital platforms to get the meaning. This shows that most learners rely on online tools to get information. Moreover, 39.1% of the learners strongly agree with the statement. This reveals that the majority of learners are more likely to use digital media for their vocabulary building. This result suggests that it is the most effective way of learning vocabulary. However, 5.2% of the respondents strongly disagree that digital media are used to look up unknown words. This means that the tools are not useful for them or they are not part of their vocabulary building routine. Likewise, 7.8% of the respondents disagree with the statement, meaning that they do not rely on digital media while checking word meanings. This group may rely on print dictionaries. In addition, 13% of the respondents remain neutral with the statement. They may use a mix of both digital and traditional resources. Overall, the analysis shows that the majority of the respondents prefer to use digital media for looking up unfamiliar words. Most of the respondents believe that digital platforms are popular and effective tools for vocabulary enhancement.

5. I believe that digital media provides a variety of contexts that help me understand new vocabulary better.

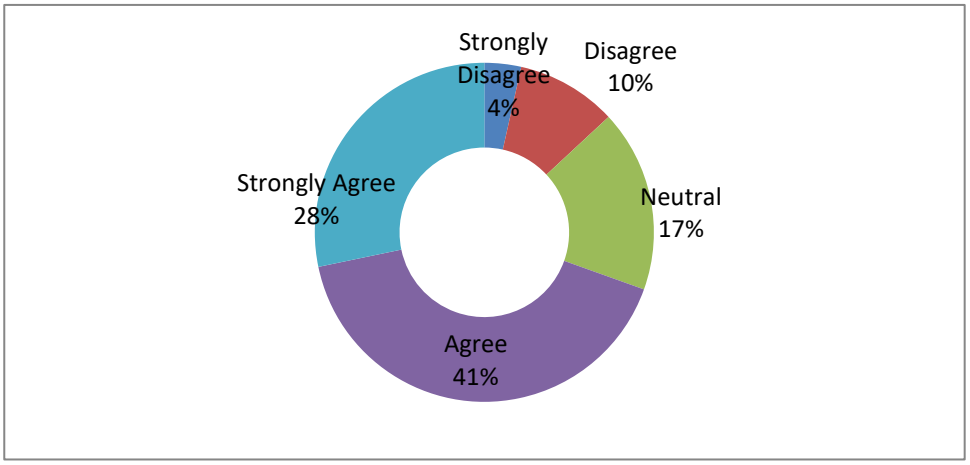

Figure 4. Respondents' level of agreement about digital media providing a variety of contexts for a new vocabulary they learn

Figure 4 exhibits how respondents perceive the role of digital media in helping them understand new vocabulary. 41% of the respondents agree that digital media provides a variety of contexts that enhance their understanding of new words. This means that most learners find different online content to help grasp the meaning and usage of vocabulary. Also, 28% of the respondents strongly agree with this statement. This group appreciates the contextual variety afforded by digital platforms. This group learns from different contexts created for them using articles, videos, and interactive content that improve their vocabulary learning. 4% of the respondents strongly disagree that digital media helps them understand new vocabulary. This group might perceive digital media is not helpful for vocabulary acquisition. This group of students prefer more conventional methods of learning. On the other hand, 10% of the respondents disagree with the statement, meaning they may not find digital media use very effective in offering multiple contexts to learn a vocabulary. This group might prefer other tools to learn new words through. 17.4% of the respondents are neutral with the statement. Generally, the majority of the respondents consider digital media as just one of many tools to learn new vocabulary. The result suggests that a very high consensus about digital media in context-vocabulary settings exists. They believe that digital platforms are useful in offering varied and contextual information that helps their understanding of new words. Overall, the result of the study highlights that students believe digital media provides a variety of contexts that help them understand new vocabulary in a better way.

1. The vocabulary I learn through digital media is relevant and useful for everyday communication.

Table 2. Respondents' level of agreement about the usefulness of digital media for their everyday communication

	Percent
Strongly Disagree	10 (4.3%)
Disagree	18 (7.8%)
Neutral	38 (16.5%)
Agree	88 (38.3%)
Strongly Agree	76 (33.0%)

Table 2 indicates that most of the respondents have found the vocabulary learned via digital media to be relevant and helpful in their daily communications. 38.3% of the learners agree that the words they come across over the internet are of practical value for them in daily interactions. This means that digital media is seen as a great resource in learning vocabulary, and it has a direct effect on real-life communication. Furthermore, 33% of the respondents strongly agree with the statement that they acquire vocabulary from digital sources, where the acquired vocabulary is very applicable in normal day-to-day conversations. This shows that there is a strong linkage between the digital learning experience and the practical application of the language. In contrast, 4.3% of the respondents strongly disagree, indicating that digital media is not useful for applying vocabulary to their everyday communication. This group believe that digital media may not always meet their needs for practical language use. Besides, 7.8% of the respondents disagree, signifying that they may use digital media to acquire vocabulary, but it is not necessarily relevant to the communication they use daily. This group may be more inclined toward other sources or methods that are more practical for their language needs. 16.5% of respondents are neutral with the statement, which could indicate a lack of concern about the relevance of digital media vocabulary. Overall, the data highlights that digital media is a beneficial tool for practical vocabulary acquisition.

7. I prefer using digital media for vocabulary learning over printed materials.

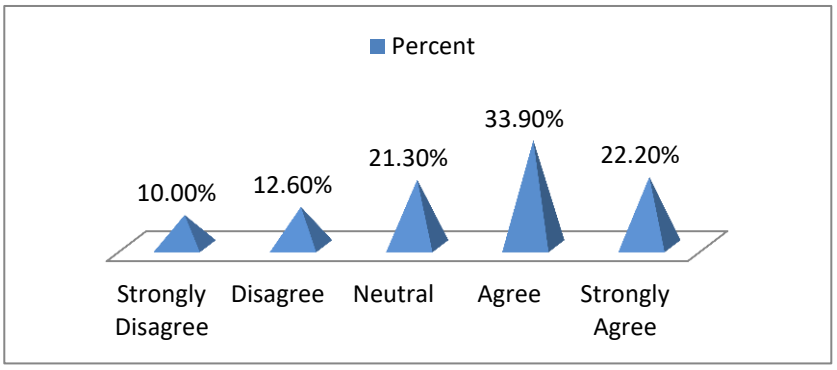

Figure 5. Respondents' level of agreement about preferring digital media for vocabulary learning than printed materials

Figure 5 provides data on how the respondents feel about using digital media compared to printed materials in learning vocabulary. 33.9% of the respondents agree that they would rather use digital media instead of printed ones in learning words. This means that most learners prefer digital tools more effective in improving their vocabulary than traditional printed material. In addition, 22.2% of the respondents strongly agree with the statement. For this group, digital resources are valued because of their convenience facility interactive exercises, and immediate access, which makes learning easier compared to printed materials. On the other hand, 10% of the respondents strongly disagree that digital media is preferred over printed materials. This means that some of the respondents feel that the resources in print worked better than digital media. In addition, 12.6% of the respondents disagree with this statement, meaning that they prefer print forms to improve their vocabulary learning. 21.3% of respondents are neutral with the statement, which suggests that they do not have a strong preference for digital media or printed materials. Overall, the data indicates a clear preference towards digital media, with over 56% of respondents agreeing or strongly agreeing with digital media preference for vocabulary learning. This discovery indicates that both digital and traditional methods have their strengths in enhancing students' vocabulary learning.

8. I use digital media to practice and reinforce new vocabulary regularly.

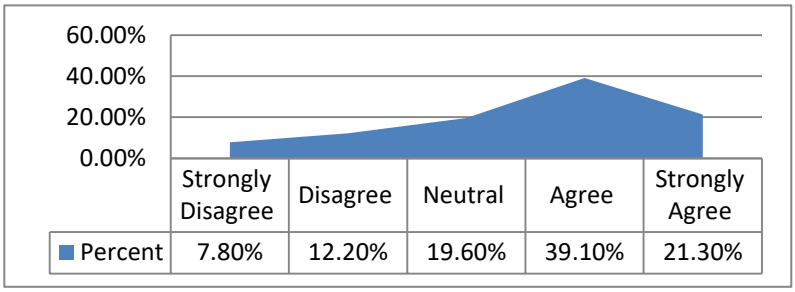

Figure 6. Respondents' level of agreement about the use of digital media in practicing and reinforcing new vocabulary

Figure 6 shows respondents' level of agreement regarding the statement "I use digital media regularly to practice and reinforce new vocabulary". 39.1% of the respondents agree that they use digital media regularly to learn vocabulary. This result reveals why most learners would find digital tools useful to work actively with new words. Furthermore, 21.3% of the respondents strongly agree with the statement. For these students, digital media is one of the key tools for learning vocabulary. This indicates that they rely on the availability and usage of online sources, such as language learning apps or interactive exercises, to strengthen their vocabulary skills. In contrast, 7.8% of the respondents strongly disagree with the statement. This group demonstrates that they do not prefer digital media as a means of practicing and reinforcing new vocabulary. Similarly, 12.2% of the respondents disagree with the statement, which might mean they would not use it regularly or they may not consider it important for their vocabulary practice. This group prefers a traditional learning approach. Another 19.6% of the respondents are neutral with the statement. These individuals may use digital tools but do not place them at the center of their routine in vocabulary learning. Overall, the result indicates that most respondents use digital media for their daily vocabulary practice.

9. I feel more motivated to learn new vocabulary when using digital media compared to traditional methods.

Table 3. Respondents' level of agreement about their motivation to learn new vocabulary using digital media than traditional methods

	Percent
Strongly Disagree	14 (6.1%)
Disagree	26 (11.3%)
Neutral	35 (15.2%)
Agree	90 (39.1%)
Strongly Agree	65 (28.3%)

Table 3 displays that the majority of the students are more motivated to learn new vocabulary using digital media than using the traditional way. Many learners (39.1%) agree that their use of digital media increases their motivation for vocabulary learning. This suggests that many

learners find digital tools engaging or somewhat spiced up compared to conventional approaches. In addition, 28.3% of the respondents strongly agree that digital media increases their motivation to learn new vocabulary. The percentage reflects that digital materials where enthusiasm and interactivity are incorporated make them more appealing when used in learning and it makes them more motivated. This would consequently increase their preference for a digital approach over the traditional one. However, 6.1% of the respondents strongly disagree with the statement that digital media does not contribute to their motivation. According to this group, digital media does not play a critical role in motivating them for vocabulary learning or the respondents belonging to this group prefer traditional methods. 11.3% of respondents disagree with the statement. This shows that they have no confidence that digital media would boost their vocabulary learning. 15.2% of the respondents have a neutral response, meaning that they have no strong opinion regarding whether digital media are motivating or demotivating as far as their influences on their motivation are concerned. Generally, the result of the study shows that most students feel more motivated to learn new vocabulary when using digital media compared to traditional methods.

10. I feel that digital media offers a more interactive and engaging way to learn vocabulary.

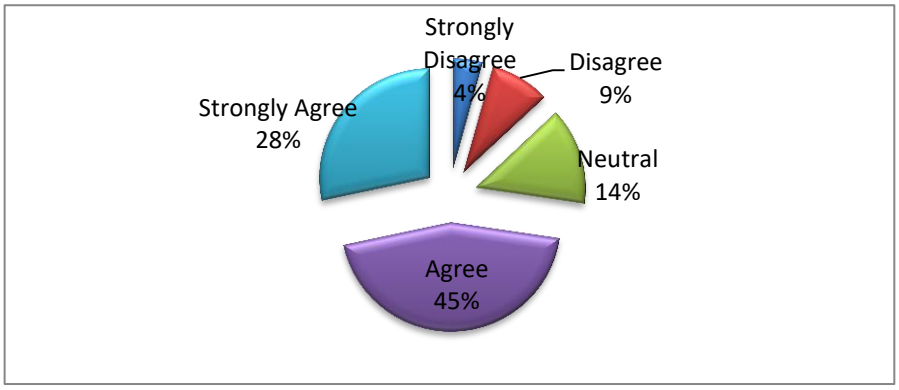

Figure 7. Respondents' level of agreement about digital media offering a more interactive and engaging way for learning vocabulary

Figure 7 demonstrates that most of the respondents believe that digital media is interesting, involving, and full of activities for learning vocabulary. 45% of the respondents agree that they perceive digital media, such as apps, online games, and exercises are effective in making vocabulary learning more dynamic and participatory. In addition, 28% of the respondents strongly agree with the statement. This indicates that digital media contributes very much to their vocabulary learning. This shows that the interactive characteristics of digital media, for example, quizzes, digital media content, and instant feedback are not found in the traditional methods. However, 9% of the respondents disagree with the statement. This group probably feels there is inadequate engagement or interactivity with digital media as opposed to the other learning methods. Furthermore, 4% of the participants strongly disagree that digital media is more interactive and engaging. This would mean that perhaps they use digital media and means, however, vocabulary learning experience has not significantly improved due to the use of digital media, and they like to use other methods to improve their vocabulary knowledge. 14% of the respondents are neutral with the statement. Overall, the study reveals that the majority of the students feel that digital media offers a more interactive and engaging way to learn vocabulary.

11. I frequently participate in online vocabulary quizzes or games to improve my word knowledge.

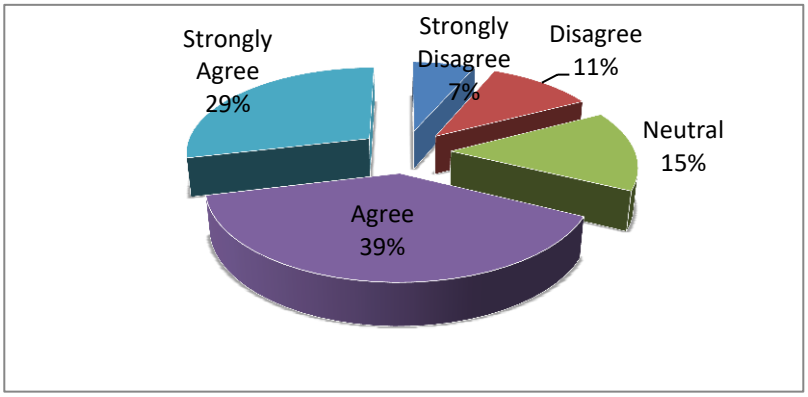

Figure 8. Respondents' level of agreement about participating in online vocabulary quizzes or games to improve their vocabulary knowledge

Figure 8 reveals students' experiences towards engaging with online quizzes or games to enhance vocabulary knowledge. 39% of respondents agree that they often take part in online quizzes or games activities. This suggests that a large number of students actively use online quizzes and games as a tool to improve their understanding and retention of new words. In addition, 29% of the respondents strongly agree with this statement, meaning they have a great commitment to using digital tools in building vocabulary. For this particular group of students, online quizzes and games were considered essential strategies that offer them motivation and interactive practice. On the other hand, 6% of the respondents strongly disagree that they frequently use online quizzes or games. This means this group of respondents do not prefer such activities for their vocabulary learning practice. In addition, 11% of the students disagree with the statement. This means that they may not find online quizzes or games as a core part of their vocabulary learning methods. This group might rely on other forms of learning or have different preferences for improving their vocabulary knowledge. 15% of respondents remain neutral, indicating they do not have a strong opinion about online quizzes or games effectiveness. Overall, most students believe that online quizzes and games play an important role in vocabulary enhancement.

12. Digital media platforms offer adequate explanations and examples for new vocabulary words.

Table 4. Respondents' level of agreement about digital media offering them adequate explanations and examples for new vocabulary words

	Percent
Strongly Disagree	17 (7.4%)
Disagree	22 (9.6%)
Neutral	42 (18.3%)
Agree	95 (41.3%)
Strongly Agree	54 (23.5%)

Table 4 shows how users rate the quality of explanations and examples digital media platforms give for new vocabulary words. 41.3% of the respondents agree that the quality of explanations and examples given by such platforms is good. This means that a lot of learners are making use of digital tools because they provide them with good context and clarity in understanding new vocabulary. In addition, 23.5% of the respondents strongly agree with the fact that examples are very detailed and appropriate, ranking satisfaction in the highest position for the presentational characteristics about how digital media presents vocabulary. These respondents find both the examples and explanations in digital media very detailed and relevant to their vocabulary learning. On the contrary, 7.4% of the respondents strongly disagree with the statement. This shows that digital media provides inadequate or unsatisfactory explanations for the new vocabulary they encounter. Besides, 9.6% of the respondents disagree that digital media gives adequate explanations and examples. This shows for this group digital media does not provide the necessity of clear and comprehensive explanations of vocabulary, perhaps using some other resources. Another 18.3% of the respondents are neutral to this statement. Based on the data, most students accept digital media as a helpful resource in making sense of vocabulary. Overall, the of the study found out that digital media platforms offer adequate explanations and examples for new vocabulary words which assist learners to acquire them easily.

5. Discussion

The result of the study reveals that the majority of the students feel that digital media helps them expand their vocabulary more effectively than traditional methods. Gregor and Klimova (2023) explored the effect of digital reading on second and foreign language vocabulary acquisition. Digital Resources have taken part in explaining a vocabulary in various ways. Practicing a digital reading task is a recommended technique for improving one's vocabulary knowledge. Neuman et al. (2019) examined what role pedagogical supports played in online educational videos for low-income preschoolers. These results underline the importance of intentional design in digital media for enhancing the opportunity for vocabulary learning.

In addition, the result of the study exhibits that most students often encounter new vocabulary words using digital media. Similarly, the study by Chen and Chung (2023) shows that vocabulary acquisition can be improved among English as a foreign language learner through digital media. It indicates that, aside from introducing learners to new words, digital media enhances their ability to store them and put them into use in various situations. The finding emphasizes that employing such equipment would add value to language learning. Garc á and Santos (2024) investigated different teaching methods using digital media for vocabulary building. They argue that digital tools offer great help in improving students' vocabulary learning. This study suggests ways in which teachers can integrate technology into their classrooms for better vocabulary development; it implies that high quality educational materials with good digital media components would improve students' learning and engagement.

Furthermore, the result of the study shows that digital media helps them use new vocabulary in their real-life contexts. Similarly, Wang and Lin (2023) explored how digital media supports the application of new vocabulary in real-life contexts. Their study finds that learners perceive digital platforms as effective for exposing vocabulary in practical situations, such as through contextualized examples and interactive scenarios. This study aligns with our finding. According to them, digital media gives learners further insights into using new words in practical contexts, hence demonstrating the value that media plays in improving the practical application of the vocabulary. In addition, Roberts and Smith (2024) investigated a way in which the use of digital media may provide context for vocabulary and assist in applying it appropriately in actual life environments. Their investigation indicated that students enjoy digital resources for looking at and applying new words in other useful contexts. The research confirms that digital media is of great benefit in understanding and applying new words in contexts that are not in a classroom set-up since it illustrates the usefulness of using them.

Moreover, the finding of the study reveals that the majority of the students use digital media to look up the meanings of unfamiliar words they come across. Similarly, Yeo and Kim (2023) discovered that students prefer the use of digital dictionaries and applications as compared to other means when they come across unfamiliar words. Their study further claimed that such digital tools are indeed very effective in vocabulary acquisition. According to Smith and Lee (2024), the student rating for digital platforms on increasing vocabulary is very high; hence, the digital platform proves to be very effective in modern language learning settings. Their study underlines the fact that digital platforms support easy access to resources on vocabulary and support effective learning entrenches the finding of digital media to be very popular and useful for vocabulary development. This study of Smith and Lee (2024) also aligns with the current study.

The result of the study highlights that students believe digital media provides a variety of contexts that help them understand new vocabulary in a better way. Similarly, Zhang and Wang (2023) show that digital platforms are very powerful for vocabulary learning because of the rich contextual information it gives. Their study represents how learners have an advantage with contextualized content brought about by these platforms, hence improving both their understanding and retention of new vocabulary. This confirms the results that digital media proves helpful in offering different contexts that make vocabulary acquisition better. In addition, Nguyen and Richards (2024) examine the contribution of digital tools towards contextualized vocabulary learning. Their study concludes that learners like digital platforms because they provide them with varied, contextual information about new words, enhancing their deeper understanding of vocabulary. This indicates that digital media is an important factor in improving vocabulary acquisition through learning in context.

The finding of the study shows that the vocabulary they learn through digital media is relevant and useful for their everyday communication. Similarly, Kim and Park (2023) examined the relevance and utility of vocabulary acquired through digital media for daily communication. Their study reveals that a significant number of learners find the vocabulary they encounter online to be highly relevant and beneficial for their everyday interactions. The study concluded that digital media does indeed promote real-life language use in agreement with the conclusion that digital environments are considered very useful for improving real-life communication. In addition, Johnson and Green (2024) explained the usage of vocabulary learnt via digital media in everyday communication. These findings further ascertain that learners feel the type of vocabulary they have been exposed to through digital sources to be relevant and useful in day-to-day usage. This fact indicates that digital media provides real-life, impactful vocabulary and that digital tools are worthwhile for practical language use.

In addition, the study finds out that most students prefer using digital media for vocabulary learning over printed materials. Similarly, Davis and Thompson (2023) found that students exhibit a clear preference for digital media over printed materials in vocabulary learning. Their study shows that learners appreciate the interactive and digital media features of digital tools, which they find more engaging and effective compared to traditional print resources. This preference highlights the use of digital media in modern educational contexts for expanding vocabulary. In addition, Martinez and Gonzalez (2024) illustrated the effective quality of the learner toward digital tools compared to printed material for improving vocabulary. The analysis obtained from this study shows that the majority of learners prefer digital tools since they are accessed easily and are more interactive, as well as containing diversified content. This finding shows that digital media is more preferred over the traditional printed material for learning vocabulary.

Moreover, the finding of the study reveals that the majority of the learners use digital media to practice and reinforce new vocabulary using in their daily communications. Similarly, Patel and Kim (2023) investigated how digital tools ease active engagement in learning vocabulary. Their research demonstrates that digital media, with its interactive features such as quizzes, games, and digital media content, significantly enhances learners' ability to engage with and solidify their understanding of new words. The study provides evidence that these tools are effective in making vocabulary acquisition more dynamic and impactful. In addition, Huang and Liu (2024) investigate the use of interactive digital tools in vocabulary learning. Their findings show that these digital tools have been very effective in the engaging practice of new vocabulary. In other words, the interactive nature of digital tools gets learners more involved in their effort to understand and learn new words through facilities such as individual feedback and interactive exercises. Generally, this finding underlines the impact of digital tools on reinforcing vocabulary through active practice. The finding of study conducted by Huang and Liu (2024) aligns with the current study's result.

The result of the study also shows that most students feel more motivated to learn new vocabulary when using digital media compared to traditional methods. A study by Nguyen and White (2024) shows that learners' motivation, in using digital media, is significantly higher due to their use of interactive and interactive features found in digital tools. This finding supports that digital media is perceived to be more engaging and motivational towards vocabulary learning. In addition, Nguyen and White (2024) investigated how digital aids affect student engagement and motivation in the acquisition of vocabulary. Their research demonstrates that the interest level in vocabulary learning stimulated by the use of digital tools, such as interactive apps and online games, is very high when compared with conventional techniques. Their study underscores the impact of attractiveness that digital media in discussion arouses in learners' interest and enthusiasm toward the learning of vocabulary.

Furthermore, the study reveals that the majority of the students feel that digital media offers a more interactive and engaging way to learn vocabulary. Similarly, Richards and Schmidt (2023) explored the use of interactive computer-based tools, such as applications and games realized on the Internet to enhance vocabulary learning. Their findings underline the fact that learners find these tools engaging and effective because of their interactivity, which involves active participation and deeper involvement in the process of learning vocabulary. This confirms that digital media are much more dynamic and participative in their approach to vocabulary acquisition. Likewise, Anderson and Huang (2024) stated that digital media tools are effective for vocabulary learning. Their study indicates that learners perceive digital tools represented in interactive exercises and gamification of learning apps to be much more engaging than traditional means. Generally, the study

shows that the tools indeed provide dynamic and interactive learning, which corroborates the belief of the respondents about digital media being in a position to provide better interactivity and engagement.

The finding of the study exhibits that most students frequently participate in online vocabulary quizzes or games to improve their word knowledge. Similarly, Lee and Chen, 2023 explored the effectiveness of online quizzes and games in vocabulary acquisition. Their study finds learners use these interactive tools often, with significant improvements in both understanding and retention of new vocabulary. The results indicate the efficiency of online quizzes and games as a means of developing students' vocabulary knowledge. Moreover, Martinez and Garcia (2024) investigated the role of gamification above all, online games in learning vocabulary. Their findings are that most learners reported participating in vocabulary games and quizzes very actively because these are viewed to be helpful and effective ways through which students can effectively improve their vocabulary acquisition and retention. Their research supports the view that online quizzes and games are popular and valuable tools for enhancing knowledge of vocabulary.

In addition, the study found out that digital media platforms offer adequate explanations and examples on a specific vocabulary to help learners understand it easily. Likewise, Lee and Choi (2023) explored how digital media platforms define and provide examples for vocabulary learning. In addition, Zhang and Liu (2024) argue that learners regard digital platforms as effective sources of clear and contextually rich explanations and examples for new words. Their study found that digital tools make a vocabulary to be more understood and conveniently accessible content. Digital media platforms are acknowledged for their effective method of vocabulary teaching. Their findings indicate digital media platforms provide sufficient explanations and examples on targeted vocabulary. The research pointed out that digital media enables students to learn vocabulary in a well-structured and content-specific way.

6. Conclusion

The vocabulary acquisition and retention in the present study may have resulted from the positive learning atmosphere that accompanied the use of digital media. Vocabulary instruction through multiple modalities is beneficial for learners of different style preferences. The result of the study shows that digital media is better than traditional print materials for vocabulary learning, valuing convenience, interactivity, and accessibility. Studies support this, suggesting that digital resources enhance engagement and are better suited to modern learners' needs. Many respondents regularly use digital media to practice vocabulary, revealing the importance they place on active, ongoing engagement with new words through digital tools. The finding of the study reveals that most respondents feel more motivated using digital media, with studies reinforcing that digital methods make learning more engaging and enjoyable compared to traditional means. Respondents largely view digital media as interactive and dynamic, with features like quizzes, games, and instant feedback adding value to the learning experience. The result shows that most students regularly use online quizzes or games to reinforce vocabulary, appreciating the interactive and enjoyable approach these digital tools provide. The majority of the respondents feel digital media provides satisfactory explanations and contextual examples for vocabulary, enhancing comprehension and retention. These findings highlight the significant role of digital media in supporting vocabulary acquisition through engaging, interactive, and accessible tools. In addition, the findings of the study show a significant effect of digital media on students' active engagement and students' positive attitude towards using technology to improve their vocabulary knowledge.

Overall, the researchers concluded that digital media enhanced both vocabulary acquisition and retention of Art and Science students. This insight could help educational strategies in adopting digital resources to supplement traditional learning methods.

7. Practical Recommendations

Based on the analysis of the study, the researchers suggest some practical recommendations to improve vocabulary learning through digital media:

- ✓ Incorporate Interactive Elements in Vocabulary Learning Platforms

Teachers should design platforms that integrate quizzes, interactive exercises, and instant feedback to engage students actively in their vocabulary learning.

- ✓ Provide More Real-life Contexts for Vocabulary

Teachers should design digital contents which emphasize on real-life contexts, such as news articles, social media posts, and video content that showcase vocabulary in use.

- ✓ Offer a Variety of Learning Formats

Teachers should create a mix of multimedia resources (videos, podcasts, articles, etc.) that cater to different learning styles and reinforce vocabulary learning in multiple ways.

- ✓ Create Vocabulary Games and Quizzes

Teachers should build or enhance engaging vocabulary games, challenges, and quizzes that increase student participation and motivation to improve their vocabulary.

- ✓ Provide Contextual Explanations and Examples for Words

Teachers should use digital platforms that offer detailed word meanings, usage examples, and context-sensitive explanations to help students understand vocabulary better.

- ✓ Incorporate Social Learning Features

Teachers should use digital platforms that integrate social features like group challenges, or community-based learning where students can interact, share new words, and challenge one another to expand their vocabulary.

- ✓ Promote Regular Vocabulary Reinforcement

Teachers should apply regular vocabulary review activities within the platforms to help learners retain and recall words effectively over time.

- ✓ Provide Real-time Feedback

Teachers should incorporate real-time feedback in vocabulary learning activities which is an effective way to motivate students and help them understand where they need to improve.

- ✓ Make Vocabulary Relevant to Students' Everyday Communication

Teachers should use vocabularies which are useful in real-life communication and contents should be created around everyday situations such as social interactions, work environments, or travel to make vocabulary more practical.

8. Limitations and Future Scope

The study limited to two higher educational institutes. In addition, only 230 Engineering students were chosen to take part in the study. If more students of various universities participate in the study, the result will be more comprehensive and meaningful. Because of time and funding constraints, study was limited to two institutions. Besides, the study focuses on "Enhancing Students' Vocabulary Learning Through Interactive Digital Media: Learners' Perceptions and Outcomes." The researchers used only one tool (questionnaire) for data collection from students. If various data collection tools were employed in current study, the results could be much more accurate and reliable. Future researchers can explore the Impact of Digital Tools and Technology on Students' Vocabulary Acquisition. In addition future researchers can conduct a study on "Cognitive and Neurocognitive Approaches to Enhancing Vocabulary Learning: Strategies for Long-Term Retention". Moreover, the researchers can assess, "The Effectiveness of Contextualized Learning Approaches in Vocabulary Retention and Application Among Students".

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Conflict of Interest

The authors declare that they do not have any known competing financial or non-financial interest and/or personal relationships that could influence this research article.

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Author's Contribution

Dr. T.Sathyaseela contributed to ensure the overall clarity of the paper. **Dr. Ramesh Pettela** contributed to the edition and revision of the paper. **Dr. Ramesh M**. contributed in data collection. **Dr. S.Muralikrishnan** contributed to the edition and revision of the paper. **Dr. K.Savitha** contributed in proofreading of the paper. **Dr. Lamessa Oli** conceptualized and developed the literature review, developed objectives, designed the the research methods, analyzed data, interpreted data, presented the arguments in the article and wrote the manuscript.

We, authors, discussed the research findings, contributed to the interpretation of the results, reviews and approved the final version of the manuscript.

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Data sharing statement

No additional data are available.

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APPENDIX A

QUESTIONNAIRE FOR TEACHERS

Introduction

The purpose of this questionnaire is to gather information that will be used to investigate the "**Enhancing Students' Vocabulary Learning Through Interactive Digital Media: Learners' Perceptions and Outcomes**". You have been selected as one of the respondents, and your responses are going to be of great contribution to this study. The information that you are going to provide will be treated confidentially and for research purposes only. Please be sincere and honest in your responses. Please mark (√) on the most appropriate number of each statement that you feel most closely relates to your desired response.

Thank you for your cooperation!

Part I: General Information

1. Gender: i) Male ii) Female

Please mark (√) in the bracket that corresponds to each statement that you feel most closely relates to your desired response.

1: Strongly Disagree, 2: Disagree, 3: Neutral, 4: Agree and 5: Strongly Agree

No.	Statement	1	2	3	4	5
	Students' Related Issues					
1	I feel that digital media helps me expand my vocabulary more effectively than traditional methods.					
2	I often encounter new vocabulary words using digital media.					
3	Digital media helps me use new vocabulary in real-life contexts.					
4	I use digital media to look up the meanings of unfamiliar words I come across.					
5	I believe that digital media provides a variety of contexts that help me understand new vocabulary better.					
6	The vocabulary I learn through digital media is relevant and useful for everyday communication.					
7	I prefer using digital media for vocabulary learning over printed materials.					
8	I use digital media to practice and reinforce new vocabulary regularly.					
9	I feel more motivated to learn new vocabulary when using digital media compared to traditional methods.					
10	I feel that digital media offers a more interactive and engaging way to learn vocabulary.					
11	I frequently participate in online vocabulary quizzes or games to improve my word knowledge.					
12	Digital media platforms offer adequate explanations and examples for new vocabulary words.					